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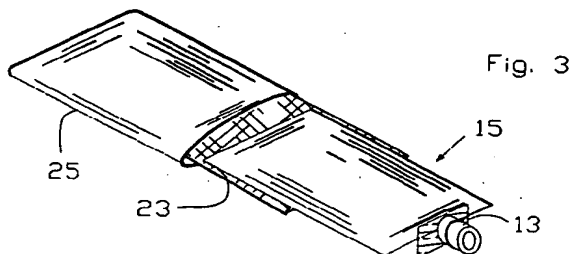
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Ink refill.

An ink jet refill pack comprises a cartridge (1) which has a hinged cover (5, 3) and receives refill (21) having an internal ink-containing bag (15) and internal absorbent paper (23) in an external bag (25) which has an opening (27) to receive excess ink from a printer. Only the refill (21) is replaced. The absorbent paper holds ink so the used refill is clean to handle.



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This invention relates to liquid ink refills for ink jet printers. An existing refill pack is a hard casing housing a bag containing ink and an absorbent pad for excess ink returned by the printer. The casing is discarded at each refilling operation. It is an object of the present invention to avoid the replacement of the hard casing.

A refill pack of the kind this invention sets out to improve is shown in U.S. Patent No. 4,760,409. This is a three dimensional unit generally having the outline of a brick or building block. When such a refill pack is mounted in a printer, a needle pierces a rubber stopper to connect ink in a bag in the refill pack through a tube to the printer. A second tube in the printer is connected back to the refill.

More specifically, the present invention is an improvement on the prior art refill pack sold by various firms, including the present applicant who sells such a pack as the IBM Ink Cartridge for the IBM 4072 Printer. That refill pack has ink in a bag resting on absorbent paper or felt, with an opening in the casing for a tube from the printer which returns excess ink. The casing is sealed, and the entire casing is discarded at each refilling operation. The absorbent paper absorbs the return ink so that it is held in the casing.

Viewed from one aspect the present invention provides an ink refill for a printer, comprising an inner bag to hold ink and to be connected through a tube to a printer, an absorbent material, and an outer bag positioned around said inner bag and said absorbent material, said outer bag having an opening to receive ink from said printer.

Viewed from another aspect the invention provides an ink refill pack for a printer, having refillable contents, comprising a rigid housing having a panel which may be opened and closed to provide access to the inside of said housing, said housing having a bracket and a hole, a bag to hold ink having a rigid plug formed to be held by said bracket to provide a connection for ink in said bag, an absorbent material, and an outer bag positioned around said inner bag and said absorbent material, said outer bag having an opening positioned in communication with said hole when said plug is held by said bracket and said bag is in said housing, said outer bag and its contents being removable and replaceable by access provided by the opening of said panel.

Viewed from a further aspect the invention provides an ink refill pack for a printer, comprising (a) an inner bag to hold ink and having a plug through which ink in the inner bag can be supplied to a printer, (b) an absorbent material, (c) an outer bag, containing the absorbent material and at least most of the inner bag, and having an opening through which ink from a printer can be received and

communicated to the absorbent material, and (d) a cartridge, more rigid than the outer bag, which can be opened and closed and into which the outer bag can be placed, and having at least one opening when the cartridge is closed to permit ink to be supplied through the plug to the outside of the cartridge and through the opening in the outer bag from the outside of the cartridge.

Thus in preferred forms of this invention the outer casing of an ink refill pack is not sealed. Inside the casing is the refill comprising the ink supply and the absorbent material, both within an outer bag. In use, the casing is opened, the used outer bag and its contents are removed and a fresh outer bag with contents are inserted. The more bulky casing is used repeatedly. This reduces total waste to be disposed of. Additionally, the refill is less bulky during shipment and storage than the previous hard casing. Since the absorbent paper traps all returned ink, the refill does not leak ink and is clean to handle.

An embodiment of this invention will now be described by way of example and with reference to the accompanying drawing, in which:-

Fig. 1 shows an empty cartridge of a refill pack;

Fig. 2 shows a refill; and

Fig. 3 shows the refill with its three major elements separated.

Fig. 1 shows an open, empty cartridge or housing 1 of a refill pack of this invention, which is identical to the sealed cartridge of the aforementioned prior art ink cartridge for the 4072 Printer except that the cover panel 3 is hinged so that it can be opened as shown, an ink baffle adjacent bracket 9 is eliminated, and absorbent paper in and near hole 17 is eliminated. Hinge 5 may be simply a thin connection between the cover 3 and the back panel 7 of cartridge 1.

Cartridge 1 has an upper bracket 9 and a lower bracket 11 which fit closely about the metal plug 13 (Fig. 2) of the ink bag 15 housing the refill ink, when cover 3 is closed. Lamination 20, which is stiff, fits in slots 22a and 22b of brackets 9 and 11. Cartridge 1 has an opening 17 in front panel 19 into which a tube from the printer (not shown) passes during use to return excess ink. Plug 13 contains material to be pierced by another tube from the printer (not shown) to supply ink from bag 15 for use by the printer.

Referring now particularly to Figures 2 and 3, the refill 21 comprises ink bag 15 and a layer of absorbent paper 23 which is on the bottom side of cartridge 1 when installed and is generally coextensive with the bag 15. A second, outer bag 25 fits closely around bag 21. Bag 25 is of compliant thermoplastic, such as high density polyethylene, and is heat sealed to the edge of refill bag 15 at the side having plug 13. Outer bag 25 is entirely

closed except for a opening 27 located to communicate with opening 17 of cartridge 1. Opening 27 is formed by bag 15 being sealed to a thin, rigid ring 29, which may be of a stiff plastics material. (Alternatively, bag 25 may simply have an opening 27 which is not supported and so which tends to close, but front panel 19 of cartridge 1 would then have spaced pins on opposite sides of opening 17 which would open the opening 27 and hold it open.)

In use, plug 13 of refill 21 having a full ink bag 15 is placed in the lower bracket 11 with the bodies of bags 15 and 25 positioned in the cartridge 1. Cover 3 is closed and latched (as by a simple, yieldable clip on cover 3, not shown). Openings 17 and 27 are located to be aligned when refill 21 is positioned in cartridge 1 since the refill is the same lateral size as the body of cartridge 1.

When the ink in bag 15 is depleted, the operator removes cartridge 1 from the printer, opens cover 3, and extracts refill 21, thereby emptying cartridge 1. A new refill 21 is loaded by placing plug 13 of the fresh bag 15 in the brackets 9 and 11 as described.

Accordingly, only refill 21 and its contents are waste to be discarded. In shipping and handling new supplies, only refill 21 and its contents are involved. Absorbent paper 23 holds the returned ink so the used refill 21 is clean during normal handling.

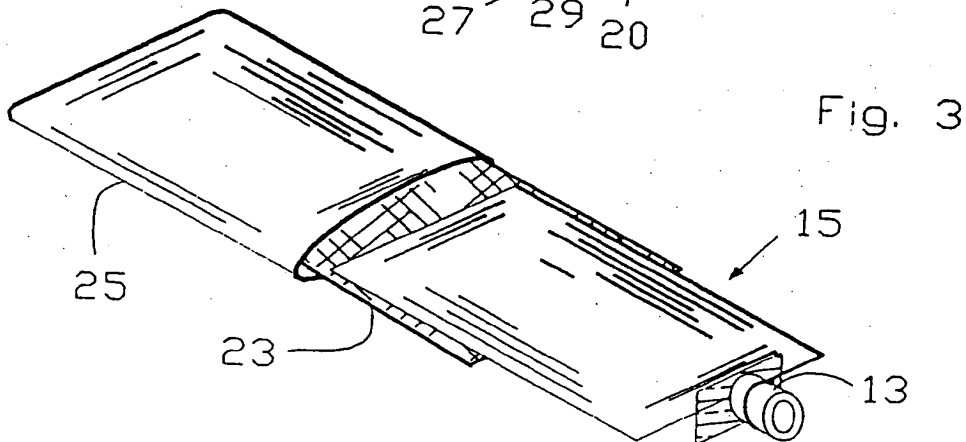
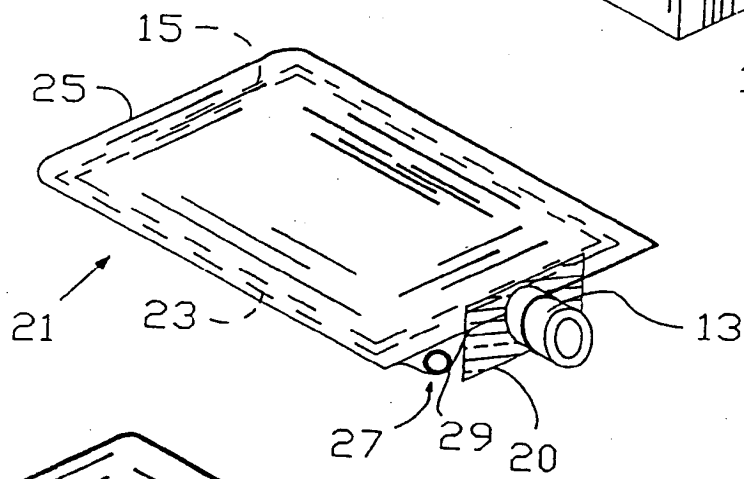
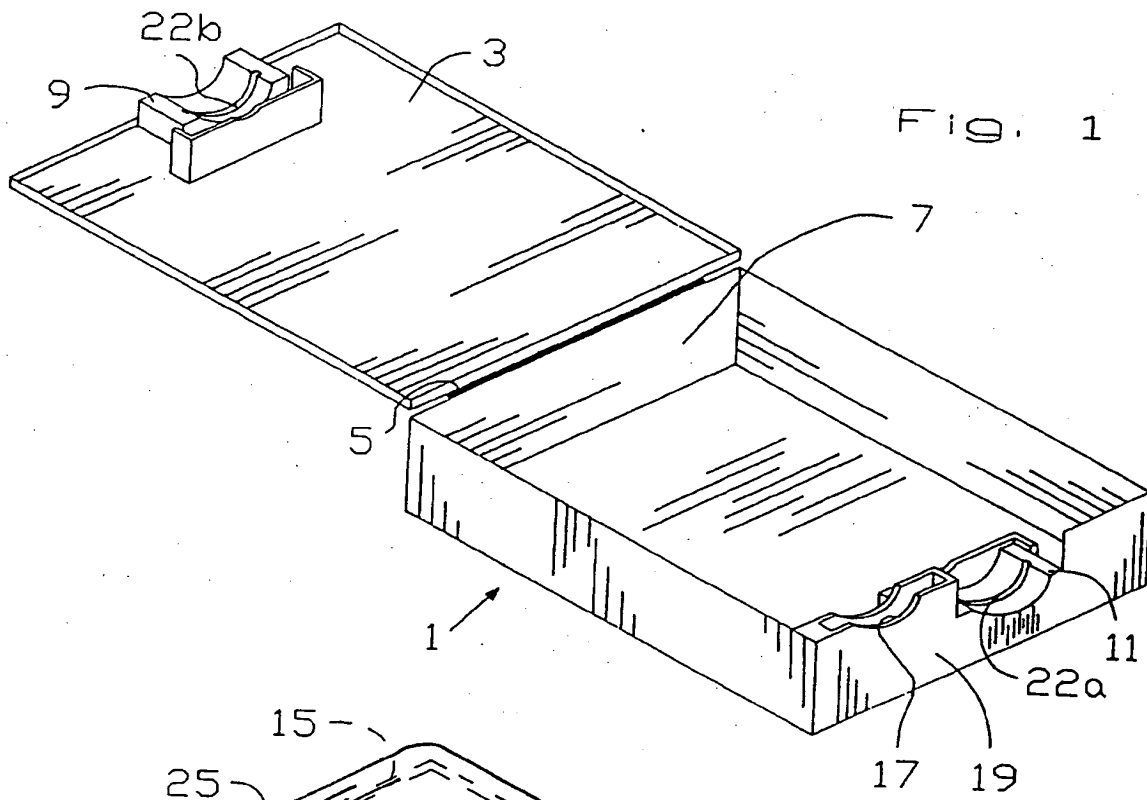
Alternatives will be apparent and may be devised which are within the scope of this invention. In particular, the outer bag 25 might be positioned by adhesive.

Claims

1. An ink refill (21) for a printer, comprising an inner bag (15) to hold ink and to be connected through a tube to a printer, an absorbent material (23), and an outer bag (25) positioned around said inner bag and said absorbent material, said outer bag having an opening (27) to receive ink from said printer.
2. A refill as claimed in claim 1, in which said outer bag (25) is of a thermoplastic material sealed around a thin, rigid ring member (29) to form said opening (27).
3. A refill as claimed in claim 1 or 2, in which said outer bag (25) is sealed to the edge of said inner bag (15).
4. An ink refill pack for a printer, having refillable contents, comprising a rigid housing (1) having a panel (3) which may be opened and closed to provide access to the inside of said housing,

said housing having a bracket (9,11) and a hole (17), a bag (15) to hold ink having a rigid plug (13) formed to be held by said bracket to provide a connection for ink in said bag, an absorbent material (23), and an outer bag (25) positioned around said inner bag and said absorbent material, said outer bag having an opening (27) positioned in communication with said hole when said plug is held by said bracket and said bag is in said housing, said outer bag and its contents being removable and replaceable by access provided by the opening of said panel.

5. A pack as claimed in claim 4, in which said outer bag (25) is of a thermoplastic material sealed around a thin, rigid ring member (29) to form said opening.
6. A pack as claimed in claim 4 or 5, in which said outer bag (25) is sealed to the edge of said inner bag (15) having said plug (13).
7. An ink refill pack for a printer, comprising (a) an inner bag (15) to hold ink and having a plug (13) through which ink in the inner bag can be supplied to a printer, (b) an absorbent material (23), (c) an outer bag (25), containing the absorbent material and at least most of the inner bag, and having an opening (27) through which ink from a printer can be received and communicated to the absorbent material, and (d) a cartridge (1), more rigid than the outer bag, which can be opened and closed and into which the outer bag can be placed, and having at least one opening (9,11,17) when the cartridge is closed to permit ink to be supplied through the plug (13) to the outside of the cartridge and through the opening (27) in the outer bag from the outside of the cartridge.



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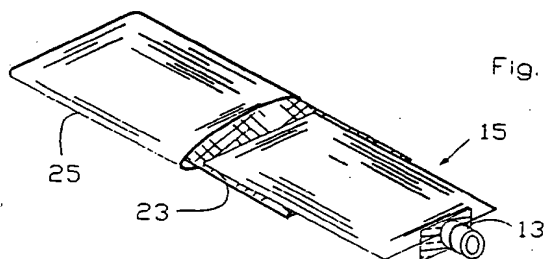


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 92 31 0821

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	EP-A-0 440 261 (CANON K.K.) 7 August 1991 * page 4, column 6, line 19 - page 7, column 11, line 12; figures *	1-7	B41J2/175
A	PATENT ABSTRACTS OF JAPAN vol. 9, no. 103 (M-377)(1826) 8 May 1985 & JP-A-59 227 458 (RICOH K.K.) 20 December 1984 * abstract *	1-7	
A	EP-A-0 364 284 (SEIKO EPSON CORP.) 18 April 1990 * page 2, column 2, line 44 - page 4, column 5, line 46; figures *	1,4,7	
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 380 (M-863)23 August 1989 & JP-A-11 033 749 (CANON INC.) 25 May 1989 * abstract *	1,2,4-7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B41J
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 November 1993	Examiner RAKOTONDRAJAONA, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			